U.S. Department of Energy
Office of River Protection
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Mr. Michael A. Wilson, Program Manager
Nuclear Waste Program
State of Washington
Department of Ecology
1315 W. Fourth Avenue
Kennewick, Washington 99336

Dear Mr. Wilson:

PLAN FOR IMPLEMENTING RECOMMENDED DOUBLE-SHELL TANK (DST) SPACE SAVINGS OPTIONS

References:
1. Ecology letter from J. J. Lyon to J. E. Rasmussen, ORP, "Response to Single-Shell Tank Retrieval Sequence and Double-Shell Tank Space Evaluation," RPP-8554 Revision 1, dated April 21, 2003.
2. "Tank Space Options Report," RPP-7702, Revision 0, dated April 2001. 56546
3. "Integrated Mission Acceleration Plan," RPP-13678, Revision 0, dated March 2003.
4. Combined report on "Single-Shell Tank Retrieval Sequence and Double-Shell Tank Space Evaluation," RPP-8554 Revision 1, dated September 2002. 58132

The U.S. Department of Energy, Office of River Protection (ORP) is submitting to the State of Washington Department of Ecology (Ecology) in accordance with the request for a plan describing space-saving options planned for the DST (Reference 1). A description of the activities being implemented that increase the effective available space in the existing twenty-eight DSTs is attached. The options were originally compiled in the Tank Space Options Report (Reference 2). These options have been subsequently incorporated in the Integrated Mission Acceleration Plan (IMAP) (Reference 3) which describes the management strategies that will reduce the time and cost to close the Hanford Site Tank Farms.

Space savings are being achieved by reducing the volume of wastes already stored in the DSTs, by utilizing space that historically had been reserved for other purposes that are no longer part of the current tank farm mission, and by retrieving a portion of the Single-Shell Tank (SST) waste directly to treatment without it entering the DST system.

These initiatives, when completely implemented, could recover or avoid the use of nearly 10.0 million gallons of DST space (equivalent to about 9 DSTs) between now and 2018. These initiatives represent a recovery of more than one-half of the tank space shortage cited in your letter that would be needed to meet the 2018 SST retrieval Hanford Federal Facility Agreement and Consent Order (HFFACO) Milestone M-045-05. To date we have identified space-savings initiatives that achieve 7.4 million gallons of the 9.4 million gallon goal established in the IMAP to achieve 40 tank retrievals by 2006. The space-savings already identified substantially exceed the amount contemplated by HFFACO Milestone M-46-21 for implementing the Tank Space Options Report (Reference 2).

These space-saving options are not exhaustive. As ORP and CH2M HILL Hanford Group, Inc. gain additional SST retrieval and closure operating experience, other opportunities are expected to become apparent. Traditionally, these have included benefits derived from process optimization, such as efficiencies in recovery technologies, and reduced working volumes. We expect that continued judicious management of the DST space will make additional inroads on the predicted shortfall, and allow us to complete the mission without relying on construction of additional costly DST storage.

Even more significant will be ORP's efforts to initiate treatment by utilization of the Waste Treatment and Immobilization Plant currently under construction, and by the deployment of supplemental technologies to further enhance Low-Activity Waste treatment. The extent to which waste can be treated and disposed, when combined with the effective DST space-savings options, will enable ORP's accelerated SST retrieval and closure initiatives.

ORP discusses the results of these space-saving activities with Ecology staff on a regular basis. Both of the RPP-8554, "Single-Shell Tank Retrieval Sequence and Double-Shell Tank Space Evaluation" (Reference 4), and RPP-13678, "Integrated Mission Acceleration Plan" (Reference-3) provide information on our progress. These formal reports are supplemented and updated between revisions by milestone progress discussions scheduled for the HFFACO Quarterly Review meetings.

If you have any questions, please contact me, or your staff may contact Cathy Louie, Tank Farms Programs and Projects Division, (509) 376-6834.

Sincerely,

James E Rasmussen

James E. Rasmussen, Director
Environmental Division

TPD:CSL

cc: See page 3

cc w/attach:
K. E. Carpenter, CHG
S. B. Fowler, CHG
M. N. Jarayssi, CHG
T. L. Hissong, CHG
J. O. Honeyman, CHG
R. Ni, CHG
D. J. Washenfelder, CHG
J. J. Lyons, Ecology
TPA Administrative Record

Attachment 03-TPD-056

Activities Underway to Increase Effective Available Space Within the Existing Twenty-Eight Double-Shell Tanks (DSTs)

Activities Underway to Increase Effective Available Space within the Existing Twenty-Eight Double-Shell Tanks (DSTs)

The schedule to retrieve and close Single-Shell Tanks (SSTs) is currently dependent on available DST space and Low Activity Waste (LAW) waste treatment and disposal. Based on recent cases analyzed utilizing the Hanford Tank Waste Operations Simulator model, the equivalent of about 9.4 million gallons of additional storage space will be necessary to support accelerated retrieval of 40 SSTs through 2006.

Work is underway to implement the following initiatives that maximize DST space availability, and, in two cases, bypass the need for DSTs in the waste treatment process.

1. **Increase DST Fill Height**

Current waste volume projections use a tank fill height of 416 inches for 22 DSTs located in 241-AN, AP, AW, and SY Tank Farms, and lower heights for the 102-SY and 102-AW tanks. The existing limit provides a margin below the historic waste tank level limit of 422 inches. The 422 inch, limit was based on seismic calculations performed in the 1980s, when 422 inches was the maximum waste level used in the calculations.

Filling the DSTs to as high as 460 inches, the elevation where double-containment ends is being evaluated. The feasibility of increasing the DST fill height requires an updated seismic/structural analysis, and the evaluation of flammable gas due to increased storage and reduced headspace volumes. Some in-tank equipment will begin to come in contact with the waste at 436 inches and will have to be raised on a case-by-case basis as other project work is being conducted on individual tanks.

Successful completion of this initiative would increase DST space approximately by 100 kGal per tank on an as-needed basis. The added space would be filled according to the retrieval and waste transfer schedules.

This effort is predicted to increase the aggregated DST storage capacity by approximately 1.1 mGal.

2. **Concentrate Existing Supernatant Waste to a Higher Density**

Currently, tank waste concentration in the 242-A Evaporator is limited to a specific gravity of 1.41 g/mL. This reduces the potential that flammable gas could become trapped in the stored waste and result in periodic flammable gas release events. In actual practice, evaporator campaigns have previously stopped short of the limit to ensure that it is not violated.

Tank-by-tank assessments may allow additional concentration as high as 1.6 g/mL. For example, laboratory work conducted for the second Fiscal Year (FY) 2003 campaign

showed that a final density of 1.47 g/mL was acceptable. Assuming that future evaporator campaigns would reach 1.47 g/mL density on average, the additional concentration would create approximately 2.6 mGal of additional tank space.

3. **Maintain Reserve Emergency Space Compliant with U. S. Department of Energy (DOE) Order 435.1, *Radioactive Waste Management***

Previously 2.2 mGal of tank space was kept in reserve for emergencies, while the order only requires space equivalent to the largest single vessel in waste storage or processing systems (1.1 mGal, space equivalent to one DST). Reducing the reserve space to respond to a single emergency - equivalent to the largest volume of waste planned to be stored in DSTs (1.26 mGal – 460 inches) - will provide about 1.0 mGal of additional space to support SST retrievals. This action will be fully implemented by the end of May 2003 and is being incorporated into future tank space evaluations.

4. **Use "Restricted" Space in Waste Treatment Plant Staged Feed Tanks**

Currently, the "restricted" space in fourteen DSTs that contain staged feed for the Waste Treatment Plant (WTP) is not available for use. This "restricted" space consists of available tank freeboard above the waste that has already been characterized as feed for the WTP. Backfilling of these tanks could potentially affect the existing characterization of the WTP feed. Currently these tanks cannot receive additional waste without DOE Office of River Protection approval.

This initiative would transfer control of the restricted DSTs to CH2M HILL Hanford Group, Inc. (CHG). The waste feed control process is currently being implemented to preserve near-term WTP feed characteristics. The available space in these tanks can then be filled with additional waste to the new fill height, recovering about 0.8 mGal of underutilized capacity.

5. **Bypass DSTs for Selected SST Retrievals**

Direct retrieval of SST waste to supplemental waste processing will bypass the DST system and reduce the need for additional tank space for retrieval and treatment of those wastes. Direct retrieval of SST transuranic waste to supplemental processing without utilizing DST space for staging and transfer will make an additional 0.5 mGal of DST space available. Similarly, direct retrieval of SST low-level waste to supplemental processing will make an additional 1.3 mGal of DST space available.

Timing of Initiatives

The accompanying table shows the expected results from these multiple space-saving options between present day and the end of FY 2006, when the existing CHG contract completes. To date we have identified options that are expected to recover about 7.4 mGal of additional DST space during this period.

Table. Projected DST Space-Savings through FY 2006 (kGal)[1]

	FY03				FY04				FY05				FY06				TOTALS
	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	
Increase Double-Shell Tank Fill Height		300	200	100		100	200			100		100					1100
Concentrate Existing Supernatant Waste to Higher Density (1.37 g/mL to 1.47 g/mL)	138	359	319	169	161	202	438	114	66	174	0	107	73	80	82	131	2613
Reserve Emergency Space Compliant with DOE 435.1, *Radioactive Waste Management*[1]			1014														1014
Use "Restricted" Space in Waste Treatment Plant Staged Feed Tanks[2]			50	41	15		33		700								839
Direct Retrieval of SST Transuranic Waste to Supplmental Processing3						265	106	166									537
Direct Retrieval of SST Low-Level Waste to Supplemental Processing[4]										660				656			1316
Total by Quarter	138	659	1583	310	176	567	777	280	766	934	0	207	73	736	82	131	
Cumulative DST Space Gained	138	797	2380	2690	2866	3433	4210	4490	5256	6190	6190	6397	6470	7206	7288	7419	7419

Table Notes

1. Reduce Emergency Space/WTP Return Space = 2280 currently - 1266(new higher fill limit for one tank) = 1014 Kgal.
2.. Restricted Space Use:
   FY03-3Q-------50 Kgal addition to AY-102 from C-106 & 244-AR
   FY03-4Q-------41 Kgal addition to AP-104 (1144-1103). Tank is reconcentrated and topped off.
   FY04-1Q-------15 Kgal to AP-105 (1144-1129). Tank is reconcentrated and topped off.
   FY04-3Q-------33 Kgal addition to AP-101 (1144-1111). Tank is reconcentrated and topped off.
   FY05-1Q-----700 Kgal addition of C-104 wastes to AY-101.
3. TRU tanks for the BCR projection--B-201, T-201, T-202, T-203, T-204, B-202, B-203, and B-204.
4. LLW tanks for the BCR projection--TY-102, T-110, and T-111.

5/15/03